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THE METAPHYSICAL STATUS OF SENSATIONS

> "When the eye and the appropriate object meet together and give birth to whiteness and the sensation of white, which could not have been given by either of them going to any other, then, while the sight is flowing from the eye, whiteness proceeds from the object which combines in producing the color; and so the eye is fulfilled with sight, and sees, and becomes, not sight, but a seeing eye; and the object which combines in forming the color is fulfilled with whiteness, and becomes not whiteness but white, whether wood or stone or whatever the object may be which happens to be colored white. And this is true of all sensations, hard, warm, and the like, which are similarly to be regarded, as I was saying before, not as having any absolute existence, but as being all of them generated by motion in their intercourse with one another, according to their kinds." (Plato: *Theætetus*, pp. 156–157, Jowett's translation.)

IF one ever needs excuse for quoting Plato, it would do in this case to plead that the doctrine contained in the passage is brilliant, thorough, and sound. The history of philosophy, in its meandering course, has brought forth no improvement upon the statement put into the mouth of Socrates by his great pupil. One need not agree with all the positions of Plato in even the dialogue from which the above passage was taken in order to enter fully into the proffered analysis of the metaphysical status of sensations. Socrates is making no pretense of originating a new doctrine: he is expounding that of Protagoras. Indeed he seems to accept as true everything which Protagoras says about sensation, except that it is knowledge. This doctrine of sensation, however sound, becomes, when coupled with the supposition that sensations are cognitive of the world beyond, involved in grave difficulties; and the followers of Protagoras through the centuries are responsible for all the copy-theories of sensation which have so led philosophy astray. But in this present paper there will be no occasion to discuss knowledge; rather the effort will be made simply to comment upon and compare with less satisfactory modern analyses that doctrine of the nature of sensations which Protagoras formulated, Socrates accepted, and Plato so beautifully put into words. And if the points commented upon seem trivial and commonplace, the writer might reply that he wishes they were so well understood and so widely taken for granted that

further restatement would be unnecessary. As so often is the case, metaphysics is needed only because there is so much bad metaphysics.

Sensation is a natural event which takes place in the world under certain ascertainable conditions. We have good reason to believe that objects existed long before they were perceived by even the first organisms endowed with organs sensitive to stimuli from those objects; and we have good reason to believe that a catastrophic destruction of all organisms would leave those objects in undisturbed existence. Sensation is an event which happens in its setting, but does not produce nor control that setting. The setting consists, for the purposes of analysis, of three significant elements or aspects. First, there is the object such as a stone, a cloud, a bon-bon, or an open fire on a wintry day. Secondly, there is the animal organism, with its end-organs of various sorts, end-organs which might under different circumstances have become other than they are but happen to be as they are, end-organs such as the eye, the ear, and the various special structures in the skin. Thirdly, there is the medium of communication between object and end-organ, the physical contact and pressure of the stone against the organ of touch, the vibrating ether between the cloud and the eye, the physical contact and chemical change which ensues when the bon-bon is dissolved upon the tongue, or the air-waves between the fire and the organ of heat. We know more about the structure of the end-organs than did Plato, and also about the mediums by which objects affect the end-organs. But Socrates did not need to know the details of all the species of processes involved in sense-experience, in order to formulate correctly the definition of the subsuming genus; and he allows adequately for the growth of scientific knowledge when he says that the various kinds of sensations are "generated by motion in their intercourse with one another according to their kinds." Perhaps no loss of accuracy in discussing sensations will result if vision is selected for special treatment; for similar things could be said about all other kinds of sensations.

The absence of one or more of the three elements of the setting in which sensations occur will of course make sensations impossible.[1] A dazzling sun may shine with unparalleled splendor for countless ages; but there will be nothing seen unless the electro-magnetic vibrations starting out from it chance to strike upon the sensitive retina of some physiological organism. A strong eye, well con-

[1] That sensations may arise under other conditions can not of course be dogmatically denied. Yet the only sensations of which we know anything are generated in the way here discussed; and we have no reason for believing in any others.

structed in all its parts and properly related to a healthy organism, may search the uttermost reaches of space; but there will be nothing seen unless there is some object within the radius of its range and some unimpeded physical force to stimulate the eye. In a world where no interactions took place between the various things of which that world might be composed, there would be no sensations; and even in a world where the requisite interactions take place, there must yet be properly formed end-organs before those influences produce sensations. If the nature of the object or the nature of the medium of communication were changed, it might well be that the end-organ would have to go through compensating changes before sensations would once more occur; and any change in an end-organ beyond a very slight one would probably forever put a stop to sensations through it, unless the other elements of the setting were altered or those elements chanced to have other activities formerly unconnected with sensation-processes and yet suited thereto in connection with the altered end-organ.

The part of Plato's doctrine of sensations which is important for metaphysics and logic remains to be noted. There is no suggestion in Plato that sensations are a new sort of entity which half conceals and half discloses the world which the organism faces—not that he specifically denies that such is the case, but that such a consideration is irrelevant to the subject-matter under examination. The followers of Protagoras who regarded sensations as knowledge might well become involved in such a distressing problem. But not Plato. For him sensations are not cognitive, and there is no need of determining whether the sensation is a "copy" of anything else. A sensation like an explosion of gunpowder is an event, with natural causes and effects; but it no more mirrors the conditions of its occurrence than an explosion mirrors the chemicals and the spark which set those chemicals off. The sensation-process is a complex process, in which, by virtue of the total situation established by object, medium, and end-organ, the object and the end-organ are temporarily of a different nature than before the situation was established. That is, the eye becomes a seeing eye, and the object becomes a white object. There would be no objection to calling the white object or the white alone by such terms as idea, impression, or psychic state, provided that no improper inferences were drawn from that term. Neither the white object nor the white is any of those things, however, if by those terms is meant a separate and distinct existence. The object seen is the object which was really there before it was seen, even though it was not then white and did not stand in the situation in which it later came to stand. There seems to be no warrant for

calling objects white unless they are seen; but the white object seen is the same object which the eye for some reason singles out from the total environment. As Plato puts it, the eye becomes a seeing eye and the object becomes a white object; and Plato would correctly add that no further entity or existence was involved in the process. The same eye may be the organ of many different sensations in which the same object is seen in many different shapes and colors; for the same object seen may be seen by the same eye in many different positions and under many different conditions. And since the nature of a sensation depends upon the total situation of object, medium, and end-organ, the nature of successive sensations will vary. No sensation "grasps" the whole nature of the object. But what is seen is real in so far forth under the circumstances, no matter whether it would be unreal under other circumstances.[2]

There is a certain sense in which men stand in the egocentric predicament, *viz.*, that they can not have sensations of objects with which they are not brought in contact according to the conditions of object, medium, and end-organ. But since knowledge is not a matter of sensations, taken singly or in complexes, there is no egocentric predicament about the cognitive experience. Also since in sensation-processes they come into contact with the natural, the objective, the real world, there is no egocentric predicament about the metaphysical status of sensations. The world as sensed is *ipso facto* a different world than the world as not sensed, just as the end-organ in action is different than the end-organ not in action. But it is important to determine what the difference is from an examination of what goes on, and not to settle such questions by a definition of what a metaphysical difference might be. Certainly as we observe the facts, there is no problem of the existence of an external world. There may well be problems as to the nature and the qualities of the seen objects in some of their unseen relationships which are not directly observed. We may well ask such questions as the following:

[2] Lest there be misunderstanding as to the meaning of *real* in the above paragraph, it might be noted that the term refers simply to what is "there," *i.e.*, to what exists at any moment. No supposition of always and forever enduring is implied. Recently Mr. C. A. Strong wrote: "If we say that data are real, we are forced to say that physical things are not real, while, if we say that physical things are real—as I think we must—we are forced to conclude that data, as such, are not real." (*Essays in Critical Realism*, p. 225.) But the bewildering dilemma clears up when Mr. Strong explains at the end of his paragraph, in a phrase which seems to have been added at the last moment to meet the objections of one of his co-authors, that *real* means "continuously existent." Such usage, if unusual, has ample historical precedent, but is not the meaning of the word in this paper.

What color would the object be in a mist? What would the object look like under a microscope? Could we see the object through a certain intervening substance? Could we see the object from a certain distance? What is the chemical constitution of the object? At what rate do the atoms of which it is composed vibrate? *Etc. etc.* But we could not legitimately ask whether there is "really" an object there; for it is given as "there." We could not legitimately ask whether it is "really" white; for if we know what the question means, we will know that in one sense it is white and in another sense it is not, and if the question means neither of these things, there is no such thing as being "really" white. We never have the task of getting from the realm of "psychic states" into the world of physical existences, but simply the task of getting from the world as it is partially perceived to the world as it is more largely inferred to be.[3] The problem of knowledge is the practical one of how to go from incomplete information to more complete understanding. That problem can not be said to involve a dualism, in any of the ordinary or historic senses of that word; it involves only a dualism between the less and the more, both of which are contained in the same total system of reality. We do not infer what things are like on the basis of "psychic states" or "ideas wholly in the mind"; but we infer what things are like in their entirety from those of their qualities and relations which we do directly perceive. Objects do not cease to be objects in becoming seen any more than they cease to be objects in becoming eaten. That, I take it, is what Plato meant when he said that the object "becomes not whiteness but white." At least, whether Plato meant that or not, it can be said that in vision objects do not themselves become, and do not produce as a sort of by-product, what are usually called "psychic states," but become seen objects. And sensation presents us with no difficulty except that of discovering from incomplete presentation of the world we confront certain other

[3] Two statements in the recent *Essays in Critical Realism* deserve comment here. Mr. Strong said: "The world as sense-perception presents it and the world as it is by no means coincide" (227). In one sense this is quite true; for the object seen is not at all times and apart from perception exactly what it is seen to be in vision. But in another sense the statement is false; for the world as sense-perception presents it is a part of the world as it is, though a small part. Mr. A. K. Rogers said in the same volume: "The world of science is distinctly not the world of immediate perception" (151). This is true of physics and astronomy to a large extent; for those sciences are interested in certain aspects of the world not presented in sensations. But it is not true of optics, acoustics, and such sciences. And it is entirely false if it is meant that there is any metaphysical difference between the world of science and the world of immediate perception.

as yet unobserved and perhaps permanently unobservable items in which we may happen to be interested. Metaphysics and epistemology can not properly be concerned with an alleged hiatus between two different sorts of existences, but with the distinction between and the differences in the things as seen and the same things as not seen, all of which exist in one continuous realm of being. Men come into limited contact with things through sensations and need to know lots of facts about their world which can only be discovered indirectly, on the basis of analogy, of inference, of hypothesis and experimentation. In other words, in addition to the knowledge which may be directly derived from such sensations as those of vision, we must have recourse to such well-guided reasonings as are furnished to us by such sciences as optics, physics, and chemistry.

II

The view of sensations thus outlined, whether or not it is to be found in Plato, is a realism or naturalism. But it differs from, though it has certain sympathies with, two commonly accepted theories, by contrast with which its significance would perhaps be more obvious. The first of these is behaviorism; the second is a dualistic realism represented by the modern tradition which comes from Locke and Kant, and which has recently been restated, in an effort to minimize the dualism, by the "critical realists." Though no effort will here be made to review those alternative views of sensation in any detail, the contrasts may be helpful.[4]

The position defended in this paper is in one sense of the word itself a behaviorism. We do not get sensations by passively waiting like the wax for the imprint of the seal. We would not call the images in a mirror sensations (that is, the sensations possessed by the mirror). An eye, however complete in all its parts, would probably not see objects, if it were detached from the organism of which it is an integral part. Unless there is reaction by as well as action upon the eye, vision does not occur. In other words, the eye must be the end-organ of some physiological unit of response, since it is probably safe to affirm that the eye taken by itself could not respond at all. Sensations, as the term has been used in this paper, are certain qualities such as blue and red, sweet and sour, hot and cold; but these qualities appear only in connection with a certain process

[4] A paper to follow this paper will examine the claim of the "critical realists" to have overcome the difficulties of the traditional epistemological dualism through their new doctrine of the datum as a logical essence. But for any such examination, a preliminary constructive statement seemed advisable of the point of view from which criticism would be brought.

which involves object, medium, and end-organ, and the activity of all those elements is jointly necessary. None of the qualities which are revealed by the process can be taken to invalidate the process, to throw doubt upon the reality of the fact that there has been such a process, to deny the reality of the conditions under which the process takes place. The description of the sensation-processes from the standpoint of the organism is what behaviorism has to tell us about sensation, and is accepted as valid and convincing by the writer of this paper.

None the less the standpoint of this paper is opposed to much contemporary behaviorism. The chief reason why behaviorism has not been even more widely and unanimously adopted in America than has been the case, and why the present writer finds it partly unacceptable, is that behaviorists have often denied the reality of obvious facts in the interests of the simplicity of their theories. When behaviorism arose shortly after 1890, largely as the result of the impetus given to psychological studies by William James, many philosophers were found describing the mind as a mere series of the sense-qualities which the processes of sensation bring into existence. It was quite natural therefore that a reaction from this incomplete description should take place, and that not simply the mind should be described in terms of the processes of sensation and the like, but the very existence of the sense-qualities should be neglected and in more extreme cases denied.[5] At least, whether natural or not, such did take place. Preoccupied with an analysis of the actions of the nervous system, behaviorists had nothing to say about the qualities which the objects have in sensation. Called to account for this neglect, they feared that they were being summoned once more to study merely these qualities; and knowing to their own satisfaction that what they had discovered about the mind could never be stated in any mere list of such qualities, however complete, they asserted that the mind was activity, not quality at all. Furthermore, fearing a renewal of the epistemological futilities of which modern philosophy has given such frequent instances, they were prompted to deny the existence of "psychic states"; and since their adversaries assured them that the qualities revealed in sensation were "psychic states," they denied the very existence of the qualities altogether.

[5] Mr. J. B. Watson only harms his own cause by his impossible identification of colors or other qualities of an object with a physiological process. *E.g.*, he recently quoted Dunlap with approval to the effect that "the so-called visual image is only an associated eye muscle strain (muscular 'sensation')." *Cf. The Dial*, Vol. LXXII., No. 1, p. 101, Jan., 1922. This is only a new form of the traditional materialistic fallacy.

To a certain extent the dispute has been merely verbal. If any one chooses to call the sense-qualities which appear in the course of the sensation-processes by the name of *mind*, there should be no objection—though care would have to be exercised to keep from various of the traditional errors which have accompanied that terminological practise during the last three centuries. Similarly if any one chooses to call the activities of the organism in sensation and the like by the name of mind, again there should be no objection. Though we can discover no reason why certain qualities should appear exclusively in connection with certain processes, yet such seems to be the fact. If either thing were singled out as that in terms of which alone mind is to be defined, the behaviorist has chosen the better element. For the sense-quality is the quality of the object: it is neither within the body nor within the confines of a mental realm distinguished from the physical world. And the error of the behaviorist is decidedly less disastrous than that of the upholders of the "psychic states"; for their error is the enthusiastic one of youth in overstating a new discovery, and involves no distortion of reality in so far as their positive, if not their negative, arguments are concerned.

Yet the issue has often gone further than a verbal dispute. The behaviorists, assured from their own studies that the thing they called mind was a certain set of activities of the physiological organism, and assured by a long and important tradition that sense-qualities did not exist outside the mind, had to deny that there were any sense-qualities at all. Mind for them was not a receptacle: it was not a place in which anything could be located. Of course their denial of sense-qualities was an error. But the trap which led them into the error was their acceptance of the supposition that sense-qualities are "psychic states." If they erred, it was due to their trusting the word of those philosophers who, in Humian fashion, treated the mind as a series of states of consciousness and denied the objectivity of sense-qualities. They are not to be much reproached for their error; for the premise which they furnished from their own experimental work was true, whereas that supplied by their fellow-philosophers, if true at all, was true only in a limited and unusual sense of the words. Those who are worried over the materialistic tendency of behaviorism have only themselves to blame; the error of behaviorism can be corrected only upon the supposition of the objectivity of sense-qualities.

The time has come to locate the error of behaviorism more fairly. The denial of the existence of facts which every man perceives every day of his life is preposterous. The existence of sense-qualities

does not have to be proved, because it is given as an immediate fact of experience. Similarly the existence of the activities of the nervous system does not need to be proved any further than behaviorists have done. What we need is to learn what various people mean by terms such as mind, and then state the well-proved conclusions in terms the meaning of which may be clear to all. No one probably would question that object, medium, and end-organ are all essential to that sort of activity of the physiological organism which we may then agree to call the process of sensation. Since mind is usually contrasted with object, we would do better not to call by the name of mind the sense-quality which the object assumes during and as a result of the process of sensation; for the sense-quality is a quality of the object. Avoiding thus the term mind for the mere existence of sense-qualities, we should recognize none the less their existence. That sense-qualities are perceived and living processes are carried on by the same organisms should not blind us to both sets of facts. The behaviorists have neglected or even denied the former; their opponents have neglected and nearly always denied the latter, and then have drawn impossible conclusions from what they have mistakenly denied as well as from what they have truly affirmed. It is theoretically possible that some other cause than the sensation-process might give rise to sense-qualities, in which case no one surely would wish to speak of a mind as present. But it is actually the case that there are a number of biological and physiological processes which seem to go on without any sensations, any consciousness, any prevision of the future; and yet even in these processes we feel that we have something akin to what we mean by mind. Thus, though it is not the purpose of this paper to define mind, it can at least be said that the term seems to be best used for those of the living processes which have assumed a certain quality and a certain form.[6]

[6] A word of warning to the critics of a revised behaviorism may be timely here. Those who treat the mind as a matter of activity or relationships are usually called materialists. But that characterization is not always correct. It would be correct if the relations were altogether spatial, if the activity were that of gross motion such as waving arms and legs about in space. But usually the relationships and activity referred to are ideal, they can be described only in terms of meaning, anticipation of the future, inference, judgment. Mr. Sellars remarked that knowledge is not "*a real relation between the knower and the known.*" (*Essays in Critical Realism*, p. 206.) I have not been able to puzzle out what he is intending to say. But his words would seem to mean either that knowledge did not exist or that the only *real relations* were spatial and material. I do not wish to be unfair. Yet I can not help but think that he tends to equate reality and matter, and to be by implication more materialistic than many behaviorists.

III

The opponents of behaviorism have almost unanimously treated sensations as "psychic states" existing in the mind and having no objective status. In fact this treatment has become so customary that it is often taken as an incontrovertible axiom which needs no proof. Each consciousness is then cut off from the rest of the world by an absolute break. And the world of nature, the objective world, is not known directly.[7]

The proofs for the subjectivity of sensations are mostly indirect, *i.e.*, they consist in showing that sensations could not be objective. There are three such proofs which have frequently been offered from Locke to the "critical realists," and there is an implicit principle or metaphysical axiom usually assumed. These must be reviewed before the thesis of this paper can be taken as acceptable.

The arguments can be briefly summed up: (1) that different people looking at the same object have different sensations, and the sensations are therefore not really in the object but only imaginatively projected there; (2) that objects seem to have contradictory qualities and hence the qualities must be, not in the object, but in the mind; (3) that the qualities we discover are different from what we know on other grounds to be the nature of the objects and hence can not be in the objects at all.[8] Now all these arguments are good as a refutation of "naïve realism" which supposes objects to be at all times just what they are seen at any one moment to be—though it may be doubted if the most naïve man-in-the-street ever held such a position. But none of them militates against the argument for the objectivity of sensations as set forth in this paper. (1) Different people looking at the same object of course have different sensations, which proves that the sense-quality is not in the object taken alone and absolutely, but which does not prove that the object may not have the various different qualities relatively to the different situations in which it stands to different organisms. Relativity is not subjectivity; and in these days of relativity, when even physicists talk in such terms, the old thoughtless identification of the relative and the subjective requires revision. If sensations are relative to medium and end-organ as well as to object, the con-

[7] *E.g.*, in *Essays in Critical Realism*, it is said that psychology deals with "subjective data" (31), that the sphere of the psychologist is "the psychical as such" (208), that a sensation, apart from its reference, is but "a pure state of our sensibility" (234), that "perception is not direct" (103), *etc. Cf.* also pp. 11, 28, 164, 192, 197, 217, *et passim.*

[8] For the most recent statement of these arguments in compact form, consult *Essays in Critical Realism*, pp. 8, 15, 133, 224, 226, *etc.*

ditions of observation would assist in determining what quality would be seen. Under identically the same circumstances the object has identically the same quality. (2) The contradictory qualities, being also a matter of diverse points of view, signify nothing in the way of subjectivity. For the contradictory qualities are not in the object taken alone. The trouble here seems to arise from considering qualities as distinct and separate entities, like a lot of marbles which small boys carry around in their pockets. The sense-qualities of objects are relative to the point of view. And unless it is contradictory to suppose that there is more than one point of view in the universe, it is hard to see why it is contradictory to suppose an object to have successively to the same organism or simultaneously to different organisms a number of different qualities. (3) The fact referred to in the third argument is not a point against the theory of this paper, but part of the position defended. But the inference from that fact betrays a *non sequitur*. Because an object does not have eternally and unchangeably a certain quality observed in sensation, is no reason why it may not have that quality in case of being related in a certain way to a certain perceiving organism. It is a long jump from the discovery that the qualities observed in sensation are not the qualities which the object has apart from sensation, to the conclusion that the qualities are not qualities of the object at all but "psychic states" in the mind. Before such a conclusion could be defended, one would have to find such a "mind" as could contain qualities, which kind of a "mind" is not revealed by experience; and even then, one would need some experimental evidence for the location of qualities there instead of somewhere else. No one has ever successfully essayed this task. Rather such a supposition is defined as an axiom and accepted as authentic before experience is examined, and experience is then made to fit into this scheme at any cost.

In addition to these arguments which are restated in various forms, there is an alleged metaphysical principle which is supposed to prove the subjectivity of sensations. Instead of going to experience to find out whether we can really see and touch objects, the advocates of subjectivism adduce an *a priori* proof against such direct contact between observer and object.[9] Mind and matter are so regarded that contact between them is deemed impossible.

[9] *E.g.*, Mr. R. W. Sellars said that the claim to have the object immediately present is "impossible," and his reason is that "it would involve the leaping of spatial and temporal barriers in an unnatural fashion" (*Essays in Critical Realism*, p. 200). The quite sufficient answer to Mr. Sellars and all the other critical realists who reject the contact of observer with object is contained in the wise words of Mr. Santayana in their own volume: "The standard of naturalness is nature itself" (p. 167).

The trouble here seems to be with the conception of cause. The assumption seems to have been made that one thing can not cause another thing unless we can understand *how* the act of causation takes place. But causation, however natural a matter, is not a logical procedure. A person who looked at the greenish-yellow gas called chlorin with its disagreeable odor and poisonous effect upon the lungs and then looked at the whitish metal called sodium which discolors so quickly as it oxidizes when exposed to the air, might never suspect that those two substances, combined in certain proportions, would give another substance indispensable to living organisms and delicious for the seasoning of food. We can discover certain facts which we can not account for; yet metaphysics should not be regarded as a process of accounting for the universe but as a statement in general terms of what the universe happens to be. Similarly we may be unable to explain why certain kinds of matter, organized in a certain way, make living beings and end-organs and nervous systems; and we may be unable to explain why under certain circumstances these living beings can perceive objects. We are entitled to seek explanation of these facts in the sense that we may search for the detailed analysis of the processes involved, but not in the sense that we may formulate a principle which will account for things being as they are instead of otherwise. However unrelated to logical processes they may be, natural processes are none the less real, *i.e.*, take place; they do not wait for the logician to justify their occurrence. Causation is not anything to be explained *en masse*, but to be accepted and to be used as an explanation of what happens to and around us. Nature is more resourceful than the mind of a rationalist. Antecedent intelligibility is not a measure of natural possibility. What is, is possible. If we *do* perceive objects, then we *can*. Metaphysicians should start with nature, not with axioms; and their principles should be generalizations from the facts, not regulations by which they, like traffic policemen for the universe, endeavor to determine the directions in which things must go.

Doubtless many advocates of the existence of "psychic states" would reject the false metaphysical axiom discussed in the preceding paragraph. But if they carry out that rejection and eliminate its implications from all their theories, what antecedent likelihood is there that objects have not "really" the qualities which they are found in experience to have, and that we do not, in spite of every indication, "really" come into immediate contact with objects? Thus the way is opened for a return to a naturalism which takes the universe at face-value, gives credit to whatever it finds

and seeks for as much more as it can discover, and recognizes the setting in which living, perceiving, and thinking go on. Naturalism in this sense is far from materialism;[10] for it regards the material world as the "natural basis" which finds its "ideal fulfilment" in the achievement of the goods which the structure of reality makes possible.[11] And thus from the slime of the sea-bed may arise beings who sing songs, build cathedrals, erect shrines to the saints, and dream of the kingdom of God. But the full meaning of naturalism is too much to attempt to define in a closing paragraph. It is perhaps enough if something has been said to reinforce Plato's contention that in vision the eye becomes a seeing eye, and the object becomes a white object.

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TRUTH AS CORRESPONDENCE: A RE-DEFINITION

THE purpose of this article is to show that by an accurate objective definition of the concepts involved it is possible to define truth in terms of correspondence, and at the same time avoid the well-known dialectical difficulties of the theory of error. Many attempts along this line have been made, but they have proved abortive. The advocates of what Joachim calls the coherence theory have found them altogether too easy to puncture. Granting that a true statement is one that corresponds with facts, they say, how are we to deal with false statements? We can not claim that they correspond to nothing at all, for this would imply that they were meaningless, which is not the case. And we can not say that they correspond with the wrong facts, for how can we determine their legitimate reference? In spite of the seeming finality of such objections, the correspondence theory of truth still survives. And it survives because of its obvious scientific common sense. But to a really striking degree epistemology has failed to put it on a sound logical basis. Propositions, assumptions, and other strange and doubtful entities have been invented to mediate between judgment and reality, and they are all conspicuously futile.

The correct solution is not by means of any of these ingenuities. It is found by taking an objective point of view in regard to the knowledge situation, and the factors entering into it. Our funda-

[10] The word naturalism has not in this paper at all the same meaning as, for example, in Professor Perry's *Present Philosophical Tendencies.*

[11] These phrases are borrowed from Santayana's *Life of Reason.*

mental assumption is that knowledge is a function of reality. And our problem is so to define this relationship as to avoid the difficulties so often pointed out in connection with other correspondence theories of truth.

To begin with a study of the terms of the relation, what are we to understand by knowledge? Objectively considered, we may take knowledge to consist of speech-reactions. That is to say, it is a particular type of behavior. At first sight this may appear very paradoxical, but only because philosophy has paid little attention to the point. For it is by no means repugnant to the common sense of man. Humanity has inevitably perceived the necessity of inventing adequate means for keeping permanent records of speech-reactions. A page of writing is just as much a record of reactions as is the tracery on the smoked cylinder by which the subject of a psychological experiment shows his responses to the flashing of lights, the tones of bells or other stimuli. But the writing is an exceedingly complex and ingenious record of highly complex responses, whereas the tracery on the smoked surface is a relatively simple, two-dimensional affair. Thus the type of behavior known as language has evidently been given very great weight by the common consent of man, and the difficulty of regarding knowledge as language is sensibly diminished.

There are, however, two objections, one systematic, the other psychological, that must be met before we can proceed. In the first place it may be said that we are defining knowledge in terms of something that is not knowledge, and that this involves a reflexive fallacy. For if we say that all knowledge is speech, it may seem that we are making one of those assertions about all propositions that are forbidden by the Theory of Types. But this is not a case of defining one entity in terms of another. We do not have knowledge on the one hand and speech on the other. From the objective point of view we have nothing but speech. The whole material of logic itself is nothing but speech-reactions.

But, in the second place, it may be said that we are arguing far in advance of the known facts. It is by no manner of means established that all cognitive processes are essentially language-processes. This is true enough, but there is no lack of negative evidence in support of our contention. Within recent years extensive attempts have been made both in this country and in Europe to demonstrate the existence of so-called imageless thought. The fate of this research is quite instructive. In laboratories of marked sensationalist tendency, imageless thought was never discovered, while in laboratories of an anti-sensationalist turn, it was. Such

an outcome can hardly fail to cast serious reflections on the whole method of introspective psychology. And specifically, it is relevant to our present discussion in that it suggests the impossibility of dealing with cognition in terms of impressions. Knowledge would seem to be an affair of reactions. And the only kind of behavior that can well be regarded as knowledge is speech. Of course when we come to the positive side of the question, and try to show that in every case of cognition a speech reaction is present, the difficulties are immense. Oftentimes the responses will be exceedingly subtle. There will be no evident motions of the vocal organs or the hands. There will perhaps be not even any palpable muscular innervations. The only changes may be in the cortex, where we have at present no means of observing them. But the decided weight of argument seems to be on the side of the supposition that from the objective point of view, cognition appears as language.

But must we not admit that types of behavior other than speech are cognitive in function—such for instance as pointing or drawing geometrical figures? When I reply to the question, "Where is the book?" by pointing, is this response not essentially knowledge from the objective point of view? Hardly, for it would seem very much more in accord with the probable psychological facts to suppose that the cognitive part of the proceeding would be found in some such suppressed, implicit speech-reaction as: "The book is where I am pointing." Again, it has been proposed that we try to communicate with hypothetical rational inhabitants of Mars by means of a figure of the Theorem of Pythagoras done large in canals on the Sahara desert. Would not the behaviors involved in planning and executing such a figure be essentially cognitive? Not so, for the essential meaning, the knowledge conveyed by such a figure, both to ourselves and to the Martians, would consist in the speech-reactions of which it would be the stimulus.

An apparently serious difficulty in regarding knowledge as consisting of speech reactions is found in the phenomena of qualitative perception. When I look at a red object, and see before me a patch of red, there seems to be something very direct and immediate in the situation. I seem to have what Bertrand Russell calls "knowledge by acquaintance." In such respects it appears, *prima facie*, that cognition is a matter of impression rather than reaction. But what actually happens? An ethereal vibration of a certain frequency impinges upon the retina, and presumably, a certain kind of stimulus travels up over the optic nerve. Does

this constitute knowledge? It is difficult to say that it does. So far, it would appear, we have nothing at all but various metabolic changes. Of course the inner secret soul or consciousness of the subject may register something. But the outside observer knows nothing of all this. Still less does he know that the impression is one of redness. Indeed the very members of the subject himself are not aware of it at this stage. If we insist on stopping here, the whole business becomes a little secret between his cortex and his soul. Indeed, it is only when the stimulus goes across into response that it becomes anything at all. If the subject is a bull, and charges, we say that he is infuriated. If he is a man, and says "That is red" we say that he has knowledge. Even in the experimental psychology of sensation, where we might expect to find pure impressions if they exist anywhere, all the data are in the form of speech-reactions, the reports of the subjects.

Knowledge then, as a set of propositions or judgments, is something that possesses physical reality. It has a position in space and a duration in time. Certainly the mere geometrical relations of a piece of knowledge, a speech-reaction, are not of the first importance. Its structural correlations with the responding organism are the truly significant considerations. It is these which science must analyze. But to point out that a judgment has the same kind of ponderable reality as a chair is far from being a waste of time. It instantly banishes many of those vague and mystifying difficulties which have led epistemology into endless and futile dialectical mazes, and goes far towards clearing up the whole discussion as to the nature of truth.

This brings to our attention the second element in the cognitive situation, the object of knowledge. And here it would seem that we must inevitably take up the position which Bosanquet and the idealists have called "naïve realism." The object of knowledge will be the thing of physics, the thing, that is to say, which by possessing mass, momentum and so forth satisfies the requirements of, and is intelligible to physical science.

Bertrand Russell has several times discussed the relation of the things of physics to consciousness. In general, ignoring minor differences, his theory is that physical objects may be regarded as aggregations of sense-data. In this respect, of course, he is simply making a refinement upon the position of Hume. It is notable that this point of view admittedly culminates in solipsism, which of itself would be enough to suggest that it must be based on some radical error. For philosophers have almost always felt that solipsism is in the nature of a *reductio ad absurdum*, even when they have not seen their way clear to avoiding it.

The fundamental objection to defining physical things in terms of sense-data is that the existence of sense-data themselves is very doubtful. Of course it is allowed that sense-data are not found in a pure or uncombined condition, which, though it certainly raises serious difficulties, may not be fatal to Russell's theory. But this is by no means all. A thoroughgoing objective psychology denies that the patch of color of a given shape and size which is a constituent of the aggregate of data which makes up the thing according to Russell, is anything at all in and of itself. Unless the stimulus issues in response, unless it affects the behavior of the organism in some definite manner, we have no reason to believe that it exists as a stimulus at all. It is with responses that we are always concerned. Thus it is impossible to admit of sense-data as ultimate notions for epistemology. And the paradoxical issue of the attempt to reconstruct the things of physics as groupings of sense-data, the fact that it directly involves such a position as solipsism, is due to employing fictions as ultimates.

It would be very much better to regard the things of physics as classes of reactions. Indeed it might be suggested that this was the way out if the notion of sense-data proved untenable. But this would at once wreck the geometrical scheme by which Russell constructs the world of physics out of appearances. If we admit sense-data as he understands them, it is possible to suppose a relation of congruence between them. And in terms of this, and one or two other concepts, such as larger and smaller, and shielding, it is not difficult to derive direction and line. This done, we define a thing as the class of all lines (which themselves are classes of sense-data) which converge at a given locus. But with responses the case is altogether different. It is out of the question to set up such relations and to derive such a scheme in this case. There is a sense in which the thing might be regarded as the class of all responses in regard to it. But inasmuch as all such responses are occasioned by stimuli, we can never escape from duality. The conception of a class of responses may conceivably have a value, but the principle of Occam's razor can never get rid of entities called things, which are the causes of the stimuli issuing in these responses.

Thus it would seem that the adoption of an objective point of view not only results in giving up knowledge by acquaintance, but also commits us to a naïve realism in regard to the objects of knowledge. For those objects appear merely as the things of physics. Beyond this point analysis can not be pushed.

But it will be said that this completely ignores so-called abstract knowledge, which purports to deal not with ponderable in-

dividual things, but with universals. Universals, however, can always be regarded as classes of things. And Russell's theory of incomplete symbols shows that the class concepts are nothing but symbolic conveniences. In other words, we deal with universals by means of nominalism. Millenniums of adjustment have so refined human speech-reactions, that it is possible for us to use the convenience known as abstract thought.

The result of our discussion so far is that in the cognitive situation we have a relation set up between two classes of physical objects. On the one hand we have the specific object known as a speech-reaction; on the other, anything else, to which the speech-reaction somehow refers. Philosophy has usually dealt with the cognitive situation by revising its conception of the object of knowledge. The tendency has been towards a monism in favor of knowledge as something at any rate non-physical. The idealist has tried to show that the understanding makes nature. The empiricist has tried to show that nature may be regarded as made up of sense impressions. Common to both is the attempt to show that nature participates in the very essence of consciousness. Our own position here is the precise converse of this. It is a monism in favor of physical reality. It claims that knowledge itself is part of nature, that it is a specific phenomenon among phenomena. When we regard knowledge as a set of speech-reactions, the mysterious gap between mind and matter is evidently closed. It is true that there is still a duality between knowledge and the things known. But the crux of truth problem becomes the analysis of the relations between two physical things, between speech-reactions, and the things to which they refer.

Coming then to a study of the relation of knowledge to its object, it will be well to remind ourselves of the central difficulty with which our account must cope if it is to be successful. The discussion of correspondence theories of truth has definitely shown that their great weakness lies in their inability to explain how a particular piece of knowledge, a particular proposition, as it were, selects the particular fact in terms of which its truth value is to be determined. It has been claimed that apart from some such notion as the intention or internal meaning of a proposition, it is impossible to understand error. For if error is failure to correspond with something, we need some intention whose frustration shall constitute failure.

How then is every judgment uniquely related to the specific fact for which it stands? Let us begin with what have been called judgments of perception. Redefining this notion in our own terms,

such judgments are those where the stimulus of the speech-reaction is that to which the judgment has reference. I see a colored patch, and respond by saying "that is red." I see my desk light burning, and the muscles of my vocal organs are innervated to make the assertion "the light is burning." In such cases the relation between the judgment and its object seems sufficiently clear. It is the relation of response to stimulus. The object is the cause of the judgment, the causal nexus taking an intricate path through the nervous ganglia. So far everything is simple enough. But as soon as we pass from judgments of this type we find a much more complex situation. Let us take two examples.

Suppose a friend of mine has assured me that he turned out my desk light. Then, when I enter the room and find it burning, my reaction may take the form of asserting "he's a liar." The stimulus comes in over a different cortical set, and issues in a different response. Or again, take the judgment "Julius Caesar crossed the Rubicon." Here the stimulus will probably be letters on a printed page. In both instances the immediate stimulus is in a sense irrelevant. How then is the judgment related to its object?

The general principle of explanation in both cases is the same. When I see the light burning and react with an assertion about my friend, the total stimulus is not merely the impact of the ethereal vibrations upon my retina. It is this impact and in addition the words of my friend. And my neural set is such that I react with regard to the latter but not the former. And when I assert that Caesar crossed the Rubicon, I am reproducing the original reaction made by observers two thousand years ago, who saw him splash through the stream and found in the sight a stimulus to the response, "He has crossed the Rubicon!" The situation is that of the psychological investigator who tabulates the results of experiments he has never personally made. He is dealing with responses whose stimuli have never gone across his own nervous system. But the whole significance of these responses is their relation to just these stimuli.

As has been pointed out, this is nothing but a very general explanation. But to demand very much more would not be reasonable. Little is known as yet of the means by which the nervous system makes selections from and performs integrations upon the vast number of stimuli which come in all the time. But psychology and neurology are decidedly justified in assuming that this enormously complex mechanism performs the task somehow. This assumption is the only hope of any sort of scientific explanation of our mental life, and it provides an excellent programme for research. It is the best we have. Without it we are reduced to sheer

miracle. And for philosophy the advantage of dealing with the relation between knowledge and its objects along this line is that it keeps us in touch with the best scientific developments, and at least gives us the assurance that we are dealing with facts rather than fiction, even though our detailed knowledge of those facts may be very partial.

Thus to sum up, every judgment is uniquely related to its object by virtue of the fact that it is a response to which the object in question has been or is the stimulus. A judgment may not be immediately occasioned by the presence of the object to which it refers—for instance it may be occasioned by a printed record. This is due to the organization of our neural mechanism, which enables us to effect vast economies in living. But always we can push back to an ultimate stopping place where the stimulus and the speech-reaction are brought together in time and space.

This analysis makes it possible for us to define truth in terms of correspondence, and at the same time to give an account of error. Fundamental to this account is the notion of a normally functioning nervous system.

For a judgment is true when it is the response of a normal organism to a given stimulus. Suppose I say "Napoleon's tomb is in Paris." Let us assume that I have read these words somewhere. Pushing back along the chain of recorded responses of which the printed symbols that I saw were the last, I come finally to the place where the original observer, who started the whole series, stood. I am directed to a particular locus, and there I receive a stimulus that issues in the response, "Yes, Napoleon's tomb *is* in Paris." And this it is which constitutes the truth of the judgment. But suppose I read "Napoleon's tomb is in Berlin." Then I am directed to another locus, where I receive another stimulus, which issues in the response "No, Napoleon's tomb is not in Berlin." This means that the original judgment was false. The chain of recorded responses always directs us to some specific locus. This is the function of what has sometimes been called the intention or "internal meaning" of the judgment. And the notion of internal meaning has been used to wreck the whole correspondence theory. In and of itself, the notion seems to be quite inadmissable. The supposition that every judgment has ultimately two kinds of meaning is one to be avoided if at all possible. Such difficulties as these, and their accompanying dialectical objections to the correspondence theory of truth vanish as soon as we bring to light a mechanism which secures correlation between judgments and their objects.

It is impossible to arrive at a satisfactory account of the objective reference of judgments so long as we consider nothing but the judgments themselves. In and of themselves they are merely physical facts. They are no more and no less mysterious than so many chairs and tables. They are simply complexes of nervous discharge and muscular tension and relaxation. If we desire to understand their epistemological function, we must not consider them alone. To do so is to commit a fatal abstraction. We must take into consideration the entire structure in which they occur—the organic structure stimulated by contacts with objects outside itself, and responding to these contacts in a thousand various ways, some of which make up what we call knowledge.

In closing, it may be well to say a word as to the bearing of this point of view upon epistemology as a whole. Bertrand Russell is responsible for introducing into philosophy a technique which in a measure deserves to be called scientific. By applying the notions and methods of symbolic logic it is undeniably possible to get a very sharp definition of certain issues, and consequently to arrive at definite solutions of detailed problems. But the difference between modern science and philosophy is something more than a mere matter of technique. It is a difference in point of view. Science is objective, and philosophy, in large measure, is subjective. Russell's own distinction between knowledge by acquaintance and knowledge by description is essentially subjective. Philosophy can not become truly scientific till it becomes objective through and through. And a most important step in this direction is to adopt an objective point of view in studying the knowledge-situation.

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THE COMPLEX DILEMMA—A REJOINDER

I REGRET that absence from the country has prevented my giving earlier attention to Professor Brogan's criticism[1] of my article on the complex dilemma,[2] since it contains a serious misrepresentation.

The "exact meaning" of my criticism of the dilemma is said to be contained in the following dilemma: "If the minor and the conclusion are exclusive alternatives, the argument is fallacious; and if the minor is exclusive and the conclusion is non-exclusive then the argument is redundant. But either the minor and the conclusion

[1] This JOURNAL, Vol. XVIII, pp. 566–7.

[2] *Ibid.*, pp. 244–6.

are exclusive, or the minor is exclusive and the conclusion is non exclusive. Therefore the argument is fallacious or redundant." And Professor Brogan adds: "It is perfectly obvious that the minor premise here is false, because it overlooks the possibility that both the minor and the conclusion may be treated as being formally non-exclusive alternatives. If this treatment is given, the complex dilemma is neither fallacious nor redundant."

The reader who cares to refer to my article will see that these remarks are wholly misapplied. So far is it from being true that I did not consider the last-mentioned possibility, that I showed explicitly that in that case the argument reduces to a familiar form of sorites. When Professor Brogan concludes that "the non-exclusive interpretation of disjunction is required for the complex dilemma," he is merely restating my own contention.

There is one point in the criticism which is well taken. The example of a complex destructive dilemma, which I quoted from Whately and Jevons, was badly chosen for my purpose. As understood by Whately it was merely redundant, and as interpreted by Jevons it was entirely correct. It is not quite accurate, however, to say of Whately that, like Jevons, he "carefully and explicitly defended the non-exclusive interpretation of 'or'." Whately held that in most cases the exclusive interpretation is called for, but that sometimes (depending on the context) the alternatives are to be taken as non-exclusive. Accordingly, in his account of the dilemma two types appear. On the one hand, it is explicitly recognized that the minor is sometimes not a strict disjunction; and on the other hand, in the construction of various examples, care is evidently taken to make the minor a strict disjunction. This is the case with the example which I quoted. It is also the case with the following. "Either they [the blest in heaven] will have no desires, or have them fully gratified." "He [Æschines] either joined [in the public rejoicings], or not." Furthermore, there is no suggestion in Whately's account that where the minor is thus clearly intended as a strict disjunction, the conclusion requires a different interpretation.[3]

This point is historically of some importance, because it is to Whately that the theory of the dilemma in its present form is directly due; and it is probably to the imperfect clearness of his account that the current misunderstanding of the topic is to be traced.[4]

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[3] *Elements of Logic*, London, 1848, pp. 108–110.

[4] Thus Bain, who draws upon Whately, interprets the disjunction strictly, without suspecting that he has modified his borrowings in any way. *Cf. Logic*, London, 1910, Vol. I, pp. 119, 121.

BOOK REVIEWS

The Reign of Relativity. Viscount HALDANE. London: John Murray. 1921. Pp. xxiii + 430.

Lord Haldane's volume is a clear and timely presentation of the general standpoint of objective idealism in the light of the science and culture of today; it falls readily within the comprehension of all seriously interested in philosophy, but without any sacrifice of essentials or evasion of difficulties. It is unfortunate that the meaning of relativity, like that of idealism itself, has become—quite apart from the scientific theory—extremely vague and confused. Haldane's own use of the term is best described as the explication of the principle of "degrees of reality." "The distinction between appearance and reality becomes one of degrees towards full comprehension. Conceptions mould the experience in which they are applied. Through our conceptions we isolate, but we isolate only special aspects of reality." These aspects, that is, never represent so many "separately existing and independent realities";[1] but separateness is repudiated not in any subjective fashion, but with reference to experience and to reality as a whole.[2]

It is especially noteworthy, in view of recent discussion, that this initial position is conjoined with an unambiguous realism; for realism can find its fullest development, I think, only in an alliance with an idealism as truly objective as itself.[3] The question is obviously too wide for consideration here; but Haldane's position is perfectly definite. "What is before us is there, and is independent of the particular onlookers who are present along with it." Thus subjectivism is excluded; and with it goes all false abstraction; for "it is discoverable for us only by means of observation and experiment, and not by *a priori* reasoning. . . . The conception of an electron may or may not be final, but it indicates what is recognized as a real complex of actual objective factors."[4] On these points Lord Haldane, to a marked degree, endorses Dr. Whitehead's contentions in his *Concept of Nature.*[5] But this agreement is qualified by the criticism that Dr. Whitehead's final conclusion is, from the strictly philosophic point of view, too absolute, inasmuch as he "can hardly claim to have excluded nature from the imputation of the in-

[1] Pp. 36, 35.

[2] "It is a relativity that is not subjective, in the sense that things are only to each of us what they appear to be" (p. 37).

[3] "The difference between idealism and realism disappears in the larger outlook that embraces the difference itself" (p. 137).

[4] Pp. 36, 47. *Cf.* p. 211—"The world is actual and independent of its observer. . . ."

[5] *Cf.* this JOURNAL, Vol. XIX, No. 6, pp. 146–157.

gression of mind into its constitution'' (p. 81). I think, however, that the difference here is entirely one of standpoint; Dr. Whitehead, ''abjuring metaphysics,'' as the scientist is entitled (if not indeed compelled) to do, regards natural phenomena as, *primâ facie*, outside or beyond the observer's mind; but this in itself does not imply any discontinuity between mind and nature as interpreted by the more inclusive philosophical standard.

From this basis Haldane develops his doctrine of relativity in the sense that, universally, ''Knowledge is foundational of reality,'' so that ''we must take account of all the degrees and levels at which it appears and interpret them according to their places in the entirety. . . . Knowledge is foundational of both apprehension and what is apprehended.'' [6] At the first glance this seems to confirm the too general impression that idealism is essentially logical and abstract—a matter of intellect or of discursive thought. But it is an outstanding merit of this volume that such an erroneous interpretation of idealism is emphatically disclaimed. ''Knowledge'' has the fullest possible significance. It is equivalent to mind, or to experience, as one continuous, immanent, and infinitely diversified whole. It is ''ultimately one and indivisible. . . . Mind, in the fullest meaning, is foundational to reality. . . . We have to interpret knowledge in no narrow sense. It will have to extend not only to notions but to feelings.'' Experience consists in short of ''the dynamic activity of mind . . . dynamic and not static, and is in its real nature subject yet more distinctly than substance.'' [7]

The principle of relativity, thus interpreted, is classical. But Haldane gives it a thoroughly independent and individual consideration in its bearing upon science and religion, society and art, which should do much to clear away the distortions and misunderstandings which inevitably gather around every great historic system. Both the exponents of idealism and its more recent opponents are subjected to vigorous and effective criticism, which may be summarized in the contention that, alike in the case of Bosanquet, Pringle-Pattison and the New-Realists, the full implications of the finitude of knowledge are not realized and developed; but this more controversial feature of the volume is best left to the consideration of the writers concerned.

The lengthy section dealing with the recent development of the purely scientific theory of relativity is naturally of special interest. The outline of the theory itself is as free from technicality as is possible in dealing with a subject so abstract, and should be helpful

[6] Pp. 124, 137.

[7] Pp. 126, 128, 147, 155, 166.

to those who still find it as a whole obscure. But when we turn from exposition to interpretation it seems to me that Haldane, though to a far less degree than previous writers, tends to read too much into the theory in both its scientific and philosophic aspects. Its strictly scientific importance is so fundamental that some degree of overstatement—for which, however, its originators are not themselves responsible—was inevitable, and here a reaction is to be expected. Haldane's objectivist standpoint safeguards him from the tendency to argue that scientific relativity implies philosophic subjectivity; "there is not one system of space-time in contrast with which others are subjective" (p. 402); and he employs Einstein's results merely by way of illustrating his general principle (p. 39). But still he appears to me to err almost as seriously in another direction, inasmuch as he omits to distinguish definitely enough between space and time, as such, and spatio-temporal measurement systems,[8] and therefore fails to recognize sufficiently that in passing from the latter, with which the scientific theory is concerned, to the former, which are the main objects of philosophical speculation, we are dealing with vitally different aspects of the real whole. The consequence is that he falls here into the error against which he constantly warns us—"the blunder of confusing our categories" (p. 37); and similarly he interprets the purely scientific conclusions too literally, without due allowance for what may, from the analogy with Kant's general method, be called the *als ob* element in the entire theory. Its principles, that is, are very largely methodological; they are adopted, and they are valid, only for certain abstract purposes of mathematical calculation and physical theory, so that (at least as matters stand at present) it is illegitimate to regard them as true apart from certain fundamental qualifications necessary when a wider range of phenomena is considered. This applies, *e.g.*, to the treatment of gravitation on p. 57.

Another somewhat perplexing feature of Haldane's position is his emphasis on the discontinuity of our categories. A consistent relativism demands, I think, an ideal continuity; and much, if not indeed all, of the value of Einstein's methods lies in the fuller continuity which they import into physical theory. Continuity is indeed clearly recognized. The result of the development of knowledge "has been accomplishing itself continuously" (p. 417), although the categories which we actually employ are as a matter of fact

[8] This fundamental distinction, curiously enough, receives due emphasis from the scientists themselves. *Cf.* this JOURNAL, XVIII., pp. 214, 215. Also Eddington, *Nature*, Feb. 17, 1921, p. 804: "Worldwide time is a mathematical system; it has not any metaphysical significance."

seriously lacking in interconnection. But idealist logic would, I think, regard this defect as due merely to our limited knowledge. Haldane, however, seems to regard discontinuity not only as occasional and transitory, but even as essential. He speaks of "levels or degrees in knowledge which have relations to each other, but are not reducible to each other. For they are ultimate. . . . The actual exhibits itself in orders irreducible to each other. . . . A living being that knows seems to belong to an order quite different in kind from that of one that lives without knowing. . . . Mechanism and life belong to different orders neither of which is explicable in the terms that belong to the other."[9] If this is literally true any continuous and progressive development of knowledge would surely be impossible; but when we consider its actual character, what we seem to find is an unceasing growth in continuity which goes on, in principle, without limit;[10] unless of course we define our categories to begin with so that they become mutually exclusive, and "mechanism," *e.g.*, means "non-living" while "life" means "non-mechanical." Haldane bases his idealistic relativity on "The Hegelian Principle" (chap. XV); and I welcome his plea for the closer study of Hegel, together with his protest against the prevailing misconception of his system. "No philosophical doctrine has been more misrepresented or given to the world in a more distorted form than has been Hegelianism in current literature" (p. 344). But the basal principle of Hegel's *Logic* is the continuity of the transition from category to category;[11] so that if we are to take the statements just quoted as really typical, there seems to be a fundamental discrepancy between Haldane's position and that of Hegel; the latter, however, appears to be more firmly established by each advance in the content of knowledge.

But there is ample room for differences of opinion here, and Lord Haldane would be the last to expect complete unanimity. His volume, taken as a whole, is a very valuable and weighty contribution to philosophical literature.

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[9] Pp. 128, 132, 147, 161.

[10] *Cf.* p. 415. "The capacity of man to interpret is unlimited in its range, because the range of mind is unlimited in its power of framing general conceptions." But does not this in itself imply that categories are not (in principle of course) ultimately irreducible?

[11] *Cf.* McTaggart, *Studies in the Hegelian Dialectic*, secs. 112–114, and *Commentary*, sec. 12.

JOURNALS AND NEW BOOKS

SCIENTIA. June, 1921. *Ten Great Epochs in the History of Mathematics* (pp. 417–428): DAVID EUGENE SMITH (New York).–Attractive little sketch of the history of mathematics from a particular point of view. *La contribution que les divers pays ont donnée aux progrès de la physique. II. Physique énergétique et physique electronique* (pp. 429–442): ABEL REY (Paris).–On the basis of the earlier discovered thermodynamic laws was built up in the late nineteenth century a science of energetics, a physics without hypotheses either atomic or kinetic. But it was on the whole infertile in new discoveries, and atomism came back to its own again with the electron theories of the twentieth century. All the different branches of physics—and chemistry as well—have now reached a new synthesis and system, one science instead of a group of partly analogous sciences; while the work of developing it has become even more truly international than ever before, though the English still think in terms of concrete models, the Germans in abstract mathematics, and the French and Italians pursue a middle course. *La constitution de l'individualité. I. L'individualité physiologique* (pp. 443–452): AUGUSTO PI SUÑER (Barcelona).–Every biological individual is capable of reproducing itself, and is unique not only in outward form but also in chemical constitution. *Problèmes financiers d'après guerre. I. Dettes publiques et charges fiscales* (pp. 453–472): CORRADO GINI (Padua).–Excellent survey of the usual means now employed to raise the national revenue, with the merits of each. *Reviews of Scientific Books and Periodicals.*

Lévy-Bruhl, Lucien. La Mentalité Primitive. Paris: Félix Alcan. 1922. Pp. 537. 25 fr.

More, Paul Elmer. The Religion of Plato. Princeton: University Press. London: Oxford University Press. 1921. Pp. xii + 352.

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NOTES AND NEWS

The Aristotelian Society met in London on February 6, 1922, Professor Wildon Carr in the chair. Mr. A. H. Hannay read a paper on "*Standards and Principles in Art,*" a synopsis of which follows:

The problem of standards and of objectivity in art is usually

debated on the basis of the alternatives of standards-and-objectivity or no-standards-and-subjectivity; and no third possibility is envisaged. Neither alternative being satisfactory, the position is a stalemate. Mr. Balfour's attitude in his Romanes lecture is typical. It is true that the standard and rule must be rejected. They involve a vicious circle and enjoy only a counterfeit stability. No mediating criterion can be set up. Each new and individual work of art carries with it its own individual and original awareness. This view however does not necessitate a lapse into subjectivism, if it is realized that the awareness or taste is itself a striving for objectivity and rightness. The very search for standards is itself the outcome of this incessant quest for right taste. While this particular search has proved fruitless, it is a half truth to say that nothing can be achieved by means of reflection, definition and analysis. Beauty is not entirely unique and indefinable. It is a process, a constructing, and can be differentiated from other processes, such as history, science, philosophy. Actually, modern criticism is full of psychological analyses which definitely involve reflective principles. These however are distinct from the old standards, inasmuch as they do not pretend to anticipate the individual content of works of art. Nevertheless the same question arises regarding them as regarding standards. Do they precede, accompany or follow upon esthetic creation and appreciation? And if they follow upon it, what is their value? It is the commonly accepted view that they are a later product. This view has been stated very lucidly and trenchantly by Benedetto Croce and is very plausible. Yet history does not confirm it and it does not explain the fact that criticism clarifies taste and is expected to do so. Croce's own admirable criticism is a good instance. It is therefore suggested that the process imagination-principle is not a passage from one independent activity to another, but a development requiring from the start both activities and in which a modification in one means a modification in the other. The critic emphasizes the universal element while the artist emphasizes the individual element; nevertheless the critic attains a clearer consciousness of the value and significance of the individual work of art.

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